**1. Understand Sorting Algorithms**

**Bubble Sort**

* **Description:** Bubble Sort repeatedly steps through the list, compares adjacent elements, and swaps them if they are in the wrong order. This process is repeated until the list is sorted.
* **Time Complexity:**
  + Best-case: O(n)
  + Average-case: O(n^2)
  + Worst-case: O(n^2)

**Insertion Sort**

* **Description:** Insertion Sort builds the final sorted array one item at a time. It is much less efficient on large lists than more advanced algorithms such as quicksort, heapsort, or merge sort.
* **Time Complexity:**
  + Best-case: O(n)
  + Average-case: O(n^2)
  + Worst-case: O(n^2)

**Quick Sort**

* **Description:** Quick Sort is a divide-and-conquer algorithm. It picks an element as a pivot and partitions the given array around the picked pivot. The process is recursively applied to the sub-arrays.
* **Time Complexity:**
  + Best-case: O(n log n)
  + Average-case: O(n log n)
  + Worst-case: O(n^2)

**Merge Sort**

* **Description:** Merge Sort is also a divide-and-conquer algorithm that divides the array into two halves, recursively sorts them, and then merges the sorted halves.
* **Time Complexity:**
  + Best-case: O(n log n)
  + Average-case: O(n log n)
  + Worst-case: O(n log n)

**4. Analysis**

**Time Complexity Comparison**

* **Bubble Sort:**
  + Best-case: O(n)
  + Average-case: O(n^2)
  + Worst-case: O(n^2)
* **Quick Sort:**
  + Best-case: O(n log n)
  + Average-case: O(n log n)
  + Worst-case: O(n^2)

**Why Quick Sort is Generally Preferred**

* **Efficiency:** Quick Sort is much faster on average due to its O(n log n) time complexity for average cases, compared to Bubble Sort's O(n^2).
* **Performance:** Quick Sort has better cache performance due to its divide-and-conquer strategy, making it more efficient for larger datasets.
* **Implementation:** Though Quick Sort has a worse-case scenario of O(n^2), it can be optimized with techniques like choosing a good pivot (e.g., median-of-three) or using hybrid algorithms like introsort.